

#15 p. 453

$$x^3 - 13x^2 + 40x = 0$$

$$x(x^2 - 13x + 40) = 0$$

$$x_1 = 0$$

$$(x - 8)$$

$$\begin{array}{r} x - 8 = 0 \\ + 8 \quad + 8 \\ \hline x = 8 \end{array}$$

$$(x - 5)$$

$$\begin{array}{r} x - 5 = 0 \\ + 5 \quad + 5 \\ \hline x = 5 \end{array}$$

(19)

$$2x^3 - 10x^2 - 100x = 0$$

$$\frac{2x \cdot x^2 - 2x \cdot 5x - 2x \cdot 50}{2x(x^2 - 5x - 50)} = 0$$

$$2x(x-10)(x+5) = 0 \quad \begin{array}{l} 2x=0 \\ x \neq 0 \end{array}$$

$$x-10=0$$

$$+10 \quad +10$$

$$x_3 = 10$$

$$x+5=0$$

$$\cancel{x+5} = \cancel{-5}$$

$$x_1 = -5$$

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$$3y^3 + 9y^2 - 162y = 0$$

$$\underline{3y}yy + 3 \cdot \underline{3y}y - \underline{3} \cdot \underline{54y} = 0$$

$$3y(y^2 + \underline{3y} - \underline{54}) = 0$$

$$3y(y+9)(y-6) = 0 \quad 3y=0$$

$$9 \cdot (-6) = \underline{-54}$$

$$9 + \underline{-6} = \underline{3}$$

$$y+9=0$$

$$y-6=0$$

$$\begin{array}{l} y_2 = 6 \\ y_1 = -9 \\ y_3 = 6 \end{array}$$

$$(23) \quad 110x - 2x^3 = 12x^2$$

$$-12x^2 - 12x^2$$

$$-2x^3 - 12x^2 + 110x = 0$$

$$-2x(x^2 + 6x - 55) = 0$$

$$-2x(x+11)(x-5) = 0$$

$$11(-5) = 55$$

$$11 + 5 = 6$$

$$x + 11 = 0$$

$$-11 \quad -11$$

$$x = -11$$

$$x - 5 = 0$$

$$+5 \quad +5$$

$$x = 5$$

$$-2x = 0$$

$$x = 0$$

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#1

$$x^3 + 3x^2 - 10x = 0$$

$$x(x^2 + \underline{3}x - \underline{10}) = 0$$

$$x(x + 5)(x - 2) = 0$$

$$x + 5 = 0$$

$$-5 - 5$$

$$x_1 = -5$$

$$x - 2 = 0$$

$$+2 +2$$

$$x_3 = 2$$

$$5(-2) = -10$$

$$5 + -2 = \underline{\underline{3}}$$

$$x_2 = 0$$

$$(3) \quad x^3 - 14x^2 + 49x = 0$$

$$x(x^2 - 14x + 49) = 0$$

$$x(x-7)(x-7) = 0$$

$$x_1 = 0; \quad x_2 = 7; \quad x_3 = 7$$

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$$(5) \quad 3x^3 + 3x^2 - 6x = 0$$

$$3x(x^2 + x - 2) = 0$$

$$3x = 0 \quad x_2 = 0$$

$$x^2 + x - 2 = 0 \quad (x+2)(x-1) = 0$$

$$x_1 = -2$$

$$x_3 = 1$$